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10/574,026

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Herbert Brunner

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EXAMINER

HOLLWEG, THOMAS A

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/574,026	<b>Applicant(s)</b> BRUNNER ET AL.	
	<b>Examiner</b> Thomas A. Hollweg	<b>Art Unit</b> 2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 28 July 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-19 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/27/08</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Acknowledgement of Amendment***

1. Applicant's Amendment, received July 28, 2008, is acknowledged. Claims 18 and 19 are added. No claims are cancelled. Claims 1-19 are currently pending.
2. Amendments to the claims for minor informalities are acknowledged. Objections to the claims are withdrawn.

### ***Priority***

3. Receipt is acknowledged of the certified translation of foreign priority document, DE 103 44 331.2. These papers, submitted under 35 U.S.C. 119(a)-(d), have been placed of record in the file.

### ***Information Disclosure Statement***

4. The information disclosure statements (IDS), both submitted on March 23, 2006, are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Claim Objections***

5. The following claims are objected to because of the following informalities:
  - a. Claims 10 and 11 are labeled "Currently amended" but there are no changes to these claims.
  - b. Claim 18, "AIO" is misspelled "AID."Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-3, 9-11, 13 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Mueller et al., U.S. Patent No. 6,717,353 B1.

8. With regard to claim 1, in figure 4, Mueller discloses a white-emitting LED with a defined color temperature, designed as a luminescence conversion LED, comprising: a primary radiation source (24), which is a chip that emits in the blue spectral region; a layer (26) of first and second phosphors in front of said source (24), both of which phosphors partially convert the radiation of the chip (24) (col. 3, lines 1-12); wherein the first phosphor is from the class of the oxynitridosilicates having a cation M and the empirical formula  $M_{(1-c)}Si_2O_2N_2:D_c$ , where M comprises Sr as the main constituent and D is doped with divalent Europium,  $M=Sr$  or  $M=Sr_{(1-x-y)}Ba_yCa_x$  with  $0 \leq x+y < 0.5$  being used, the oxynitridosilicate completely or predominantly comprising the high-temperature-stable modification HT (col. 2, lines 16-42); and wherein the second phosphor is a nitridosilicate of formula  $(Ca,Sr)_2Si_5N_8:Eu$  (col. 3, lines 42-51), producing a color temperature of from 2300 to 7000 K and at the same time achieving a color rendering of at least  $Ra = 80$  (Table, col. 4, lines 49-56).

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9. With regard to claim 2, in figure 4, Mueller discloses that in the oxynitridosilicate the Eu fraction makes up between 0.1 and 20 mol % of M (col. 2, lines 16-23).

10. With regard to claim 3, in figure 4, Mueller discloses that a proportion of M, in particular up to 30 mol %, is replaced by Ba and/or Ca and/or Zn (col. 2, lines 16-23).

11. With regard to claim 9, in figure 7, Mueller discloses that the LED has a color temperature of from 2700 to 3300 K (Table, col. 4, lines 49-56).

12. With regard to claim 10, in figure 7, Mueller discloses that the LED achieves the white luminous color by color mixing with the RGB principle, with the primary emission of the blue LED having a peak wavelength of from 430 to 470 nm (col. 3, lines 34-58).

13. With regard to claim 11, in figure 7, Mueller discloses that the emission from the chip has a peak wavelength in the range from 450 to 465 nm (col. 3, lines 34-58).

14. With regard to claim 13, in figure 4, Mueller discloses that the nitridosilicate contains Sr as a permanent component, and Ca in a proportion of from 0 to 60 mol % (col. 2, lines 16-23).

15. With regard to claim 15, in figure 4, Mueller discloses that an Ra of at least 85 is achieved (Table, col. 4, lines 49-56).

### ***Claim Rejections - 35 USC § 103***

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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17. Claims 5-7, 12, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mueller as applied to claim 1 above, in view of Delsing et al., U.S. Patent Application Publication No. 2005/0205845 A1.

18. With regard to claim 5, all of the limitations are disclosed by Mueller, as discussed in the rejection of claim 1, however, it does not expressly disclose that a proportion of the SiN group in the empirical formula for said first phosphor is replaced by AlO.

19. Delsing teaches a phosphor having the same formula as the Mueller first phosphor where a proportion of the SiN group in the empirical formula for said first phosphor is replaced by AlO [0006-0007].

20. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Mueller LED where a proportion of the SiN group in the empirical formula for said first phosphor is replaced by AlO, for fine tuning, as taught by Delsing [0007].

21. With regard to claim 18, all of the limitations are taught by the combination of Mueller and Delsing, as discussed in the rejection of claim 5, including Delsing teaching that the proportion of the SiN group in the empirical formula for said first phosphor replaced by AlO is up to 30 mol % [0007].

22. With regard to claim 6, all of the limitations are disclosed by Mueller, as discussed in the rejection of claim 1, however, it does not expressly disclose that a proportion of Eu is replaced by Mn.

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23. Delsing teaches a phosphor having the same formula as the Mueller first phosphor where a proportion of Eu is replaced by Mn [0009].

24. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Mueller LED where a proportion of Eu is replaced by Mn, for fine tuning, as taught by Delsing [0007].

25. With regard to claim 19, all of the limitations are taught by the combination of Mueller and Delsing, as discussed in the rejection of claim 6, including Delsing teaching that the proportion of the Eu replaced by Mn is up to 30 mol % [0009].

26. With regard to claim 7, Mueller does not expressly disclose that the chip is an InGaN chip. Delsing, in figure 1a, teaches a chip that emits in the blue spectral region that is an InGaN chip [0015].

27. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Mueller LED where the chip is an InGaN chip, as taught by Delsing, because this commonly used chip provides ideal radiation to excite the phosphors used in the Mueller LED.

28. With regard to claim 12, all of the limitations are disclosed by Mueller, as discussed in the rejection of claim 1 above, including that the oxynitridosilicate has an emission of green (col. 2, lines 16-23). However, Mueller does not expressly disclose that the emission of the oxynitridosilicate has a dominant wavelength  $\lambda_{\text{dom}}$  in the range from 550 to 570 nm.

29. Delsing, in figures 3 and 4, teaches the oxynitridosilicate phosphor disclosed by Mueller, where the emission color can be tailored so that the emission of the

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oxynitridosilicate has a dominant wavelength  $\lambda_{\text{dom}}$  in the range from 550 to 570 nm [0019].

30. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Mueller LED where the emission of the oxynitridosilicate has a dominant wavelength  $\lambda_{\text{dom}}$  in the range from 550 to 570 nm, as taught by Delsing, to achieve a high color rendering white light.

31. Claims 8, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mueller as applied to claim 1 above, in view of Bischoff, U.S. Patent No. 6,158,882.

32. With regard to claim 8, Mueller discloses all of the limitations, as discussed in the rejection of claim 1, however, it does not expressly disclose that the LED is dimmable. Bischoff, in figure 1, teaches an LED device (10) that is dimmable (col. 2, lines 15-31).

33. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Mueller white-emitting LED so that it is dimmable, as taught by Bischoff. An LED light source that is dimmable is very useful for many applications, such as aircraft cabins (col. 2, lines 50-54).

34. With regard to claim 16, Mueller discloses all of the limitations, as discussed in the rejection of claim 1, however, it does not expressly disclose that the system includes electronics for driving the individual LEDs or groups of LEDs.

35. Bischoff, in figure 1, teaches an LED system that includes electronics (50, 80) for driving the individual LEDs (40) or groups of LEDs.

36. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Mueller LED system so that it includes electronics for



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driving the individual LEDs or groups of LEDs, as taught by Bischoff. Groups of LED that are individually controllable are very useful for illumination applications, as taught by Bischoff (col. 2, lines 50-57).

37. With regard to claim 17, Mueller and Bischoff disclose all of the limitations, as discussed in the rejection of claim 16. Further Bischoff teaches that the electronic control (50, 80) includes means which impart dimmability (50) (col. 4, lines 66-67).

38. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mueller as applied to claim 1 above, in view of Ellens et al., U.S. Patent Application Publication No. 2002/0105269 A1.

39. With regard to claim 14, all of the limitations are disclosed by Mueller, as discussed in the rejection of claim 1 above, including that the nitridosilicate has an emission of red (col. 3, lines 45-50) and in figures 7 and 8, the peak emission of the nitridosilicate is shown to be very close to 620 nm. However, Mueller does not expressly disclose that the emission of the nitridosilicate has a dominant wavelength  $\lambda_{\text{dom}}$  in the range from 620 to 660 nm.

40. Ellens, in figure 6, discloses a nitridosilicate phosphor (3) where the emission of the nitridosilicate has a dominant wavelength  $\lambda_{\text{dom}}$  in the range from 620 to 660 nm [0023].

41. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Mueller LED where that the emission of the nitridosilicate has a dominant wavelength  $\lambda_{\text{dom}}$  in the range from 620 to 660 nm, as taught by Ellens to achieve a high color rendering white light.

***Allowable Subject Matter***

42. Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

43. The prior art of record does not teach or suggest a white-emitting LED with a defined color temperature, designed as a luminescence conversion LED, comprising: a first phosphor from the class of the oxynitridosilicates having a cation M and the empirical formula  $M_{(1-c)}Si_2O_2N_2:D_c$ , where M comprises Sr as the main constituent and D is doped with divalent Europium,  $M=Sr$  or  $M=Sr_{(1-x-y)}Ba_yCa_x$  with  $0 \leq x+y < 0.5$  being used, the oxynitridosilicate completely or predominantly comprising the high-temperature-stable modification HT, where a proportion of M, in particular up to 30 mol %, is replaced by Li and/or La and/or Na and/or Y, together with other claim limitations.

***Conclusion***

44. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas A. Hollweg whose telephone number is (571) 270-1739. The examiner can normally be reached on Monday through Friday 7:30am-5:00pm E.S.T..

45. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

46. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TH/

/NIMESHKUMAR D. PATEL/

Supervisory Patent Examiner, Art Unit 2879